UNIVERSITY AT ALBANY
State University of New York

College of Arts and Sciences
Department of Mathematics and Statistics

Algebra/Topology Seminar

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Von Neumann Algebras of Thompson-like Groups

Thursday, November 9, 2023
3:00 p.m. in BB-B012

Abstract. Given a d-ary cloning system on a sequence $(G_n)_{n\in\mathbb{N}}$ of groups, we can take a "Thompson-esque" limit to form a Thompson-like group denoted by $\mathscr{T}_d(G_*)$, and this group canonically contains F_d, the smallest of the Higman–Thompson groups. The group inclusion $F_d \leq \mathscr{T}_d(G_*)$ translates to an inclusion of their group von Neumann algebras $L(F_d) \subseteq L(\mathscr{T}_d(G_*))$. This talk will essentially be a survey of what is currently known about these von Neumann algebras coming from Thompson-like groups. Concerning the inclusion $L(F_d) \subseteq L(\mathscr{T}_d(G_*))$, I was able to prove it satisfies the weak asymptotic homomorphism property (WAHP), which is equivalent to $L(F_d)$ being a weakly mixing subfactor of $L(\mathscr{T}_d(G_*))$. That the inclusion satisfies the WAHP will have a number of consequences which I will discuss. Another main result is that many of these Thompson-like groups yield McDuff factors and hence are inner amenable, which is a considerable generalization of Jolissaint's result that $L(F)$ is a McDuff factor, where $F = F_2$ is one of the "classical" Thompson's groups.

Using cloning systems, I constructed a machine which takes in any group and produces a Thompson-like group yielding a McDuff factor. Modifying this construction, I was also able to construct another machine which takes in any finite group and any other group and produces an infinite index singular inclusion of II_1 factors without the WAHP, the first examples of their kind. Finally, using cloning systems and character rigidity, I was also able to prove the Higman–Thompson groups F_d are McDuff (in the sense of Vaes–Deprez), and using the same proof I can show that, in some cases, a certain canonical subgroup of $\mathscr{T}_d(G_*)$ yields a Cartan subalgebra in $L(\mathscr{T}_d(G_*))$.